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SATELLITE SERVICES (COSPAS-SARSAT)

Registration and Coding of 406 MHz EPIRBs

Note by COSPAS-SARSAT

SUMMARY

- Executive summary:** Noting the COMSAR 3 view that the coding and registration of 406 MHz EPIRBs should be improved, this document highlights some aspects of 406 MHz EPIRB coding and registration, and the importance of controls which should be implemented by national Administrations.
- Action to be taken:** Paragraph 18
- Related documents:** COMSAR 4/INF.9, COMSAR 3/14, paragraph 7.5

Introduction

1 At its seventieth session, the Maritime Safety Committee endorsed the Sub-Committee's view that the 406 MHz distress alerting system, in particular registration and coding of 406 MHz EPIRBs, should be improved, and instructed the Secretariat to bring this view to the attention of COSPAS-SARSAT.

2 The view noted above was reported to the Twelfth Meeting of the COSPAS-SARSAT Joint Committee held from 17 to 24 June 1998, and to the Twenty-First Session of the COSPAS-SARSAT Council held from 26 to 29 October 1998. This document highlights the actions taken by COSPAS-SARSAT on the matter of 406 MHz EPIRB coding, registration and control.

406 MHz beacon specification and COSPAS-SARSAT type approval procedure

3 COSPAS-SARSAT documents C/S T.001 "Specification of COSPAS-SARSAT 406 MHz Distress Beacons" and C/S T.007 "COSPAS-SARSAT 406 MHz Distress Beacon Type Approval Standard" are kept under review by the COSPAS-SARSAT Joint Committee and regularly updated, after approval by the COSPAS-SARSAT Council, to reflect the technical evolution of the system (e.g. change of frequency channel from 2000 to accommodate the growing number of 406 MHz beacons). This aims at ensuring that all types of 406 MHz beacons produced by manufacturers are compatible with the 406 MHz distress alerting system, satisfy the basic transmission requirements and provide adequate performance. In particular, the specification defines all acceptable coding methods for 406 MHz EPIRBs. Strict adherence to coding requirements is essential to ensure that the beacon message can be correctly recovered by commissioned COSPAS-SARSAT ground segment equipment and distributed in accordance with the COSPAS-SARSAT Data Distribution Plan (document C/S A.001).

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4 The IMO resolution which specifies the performance standards for 406 MHz EPIRBs (IMO Assembly resolution A.810(19)) identifies ITU Recommendation ITU-R M.633 as the technical specification for the beacon transmit signal and message format. In view of the modifications to the COSPAS-SARSAT beacon specification described below, including the changes to the beacon message formats previously reported to the COMSAR, COSPAS-SARSAT has proposed changes to ITUR M.633 to make the ITU Recommendation consistent with the COSPAS-SARSAT beacon specification (document C/S T.001). The proposed changes will be considered by Study Group 8 of the ITU at its meeting scheduled for 11-12 November 1999.

5 IMO Assembly resolution A.696 (17) recommends that governments implement tests to demonstrate that 406 MHz EPIRBs satisfy performance requirements in respect of the technical characteristics of the transmitted signal and the message format, or alternatively accept the results of the COSPAS-SARSAT type approval testing as defined in document C/S T.007. In view of the above, the COMSAR 4 meeting should be aware of the changes to document C/S T.007 introduced below.

Revision of COSPAS-SARSAT documents C/S T.001 and C/S T.007

6 The most recent revisions of the C/S T.001 and C/S T.007 documents concerned the introduction of new coding protocols allowing for the encoding in the 406 MHz beacon message of position information derived from internal or external navigation devices. This new capability has increased the complexity of the beacon coding schemes as the encoded data can be updated automatically after the beacon has started transmitting its digital message. The new testing requirements in the COSPAS-SARSAT Type Approval Standard (C/S T.007) include a demonstration, for each protocol that can be used with a particular beacon model, that the changing position data is correctly encoded in the beacon message. The protocols tested for each beacon model are recorded in the COSPAS-SARSAT Type Approval Certificate issued by the COSPAS-SARSAT Secretariat after successful completion of all testing requirements.

7 In addition, changes have also been introduced in both documents to respond to new developments by manufacturers combining in the same unit a 406 MHz distress beacon and ancillary devices such as a 121.5 MHz voice transceiver controlled by the operator. The changes to the COSPAS-SARSAT testing requirements aim at ensuring that ancillary devices in 406 MHz beacons do not impact on the 406 MHz distress alerting performance of the beacon. All ancillary devices integrated in a particular beacon model are recorded in the COSPAS-SARSAT Type Approval Certificate issued to manufacturers by the COSPAS-SARSAT Secretariat after successful completion of all testing requirements.

8 MSC/Circ.882 "Guidelines on annual testing of 406 MHz satellite EPIRBs" requires that testing on board ships include "decoding the EPIRB identity number and other information from the transmitted signal". This can be done using the self-test mode transmission of the EPIRB which is not processed by the satellite system. The specification in C/S T.001 included some restrictions in respect of the self-test mode, noting that such transmissions were undesirable as they could impact on the satellite system capacity. This restriction has been removed, in line with the IMO guidelines which require decoding the EPIRB identity during on board testing. However, to limit the impact of beacons' self-test mode transmissions on the system capacity, the revised specification limits this transmission to a single burst. This new requirement is also specifically tested as part of the revised COSPAS-SARSAT type approval procedure.

9 Another amendment included in the revised specification recommends that the 15 hexadecimal characters of the beacon identification be permanently marked on the exterior of the beacon. The identification marking should facilitate the control of the EPIRB identity during ship inspections and/or allow, if required by the responsible administration, a direct verification of the registration of the EPIRB.

Control and registration of 406 MHz EPIRBs

10 The registration and coding of 406 MHz beacons were discussed at the 12th meeting of the COSPAS-SARSAT Joint Committee held in June 1998, at the 21st session of the COSPAS-SARSAT Council held in October 1998 and during the COSPAS-SARSAT task group meeting on false alerts held in January 1999. COSPAS-SARSAT Participants noted and agreed with the view expressed at COMSAR 3, and endorsed at MSC 70, that the registration and coding of 406 MHz EPIRBs should be improved. In each of these forums the importance of proper beacon coding and accurate beacon registration was stressed. However, it was also noted that enforcing proper beacon coding and registration procedures was the responsibility of national administrations. Several Administrations also expressed the view that a verification of the EPIRB registration should be part of the periodical testing of 406 MHz satellite EPIRBs.

11 The registration of 406 MHz beacons is approaching 100% of the population in some countries where registration has been made mandatory. However, the percentage of registered beacons is significantly less than 100% in a number of other countries. At the COSPAS-SARSAT task group on false alerts held in January 1999, Participants stressed the importance of beacon registration information in resolving false alerts quickly and with the minimum of SAR resources.

12 In this respect, COSPAS-SARSAT Participants noted that adequate guidance documents on beacon coding and registration were available from COSPAS-SARSAT and other sources. These include:

- .1 IMO Assembly resolution A.764 (18);
- .2 the COSPAS-SARSAT documents C/S T.001 and C/S T.007 referred to above, which are distributed free of charge by the COSPAS-SARSAT Secretariat and can be downloaded from the COSPAS-SARSAT Web site;
- .3 the document C/S G.005 "COSPAS-SARSAT Guidelines on 406 MHz Beacon Coding, Registration and Type Approval", also available from the COSPAS-SARSAT Secretariat and from the COSPAS-SARSAT Web site;
- .4 the document C/S S.007 "Handbook of Regulations on 406 MHz and 121.5 MHz Beacons" issued annually by the COSPAS-SARSAT Secretariat, which summarises available information on national requirements in respect of 406 MHz EPIRBs, including the accepted coding methods, the list of EPIRBs type approved by Administrations, and administrative points of contact for beacon coding and registration; and
- .5 the list of EPIRB models successfully tested in accordance with the requirements of C/S T.007, published by the COSPAS-SARSAT Secretariat as part of the "COSPAS-SARSAT System Data" document (also available from the web site in English, French and Russian languages). This list was recently updated to include the description of battery packs to be used in each model.

13 One particular aspect of EPIRB coding and registration may need to be highlighted. The many coding protocols available for 406 MHz EPIRBs have been developed to provide for all possible national requirements. In particular, some protocols allow national Administrations to define their own coding methods for the beacon identification, using serial numbers assigned and controlled by themselves. A difficulty arises when EPIRBs pre-encoded by the manufacturer according to this type of "national" identification rules, are sold to ship owners from other countries. The EPIRB should be recoded as necessary at the point of sale, or by an authorised agent, according to the requirements of the Flag State, and registered as appropriate.

14 However, some countries accept any identification method, only asking for their Country Code (i.e. the MID) to be included, and do not control the complete EPIRB identification upon registration. It follows that:

- .1 coding errors go undetected; and
- .2 two or more EPIRBs could have the same identification if the Country Code is changed and the rest of the beacon code is not controlled.

15 It is therefore important that Administrations ensure the appropriate control of EPIRB coding when the beacon is registered. To assist in this matter, COSPAS-SARSAT has provided in the document C/S G.005 an illustration of all available coding schemes. Document C/S G.005 also recommends that whenever possible and, in particular, when serial numbers are not specifically assigned by the responsible national Administration, the COSPAS-SARSAT Type Approval Certificate number, which is unique for each beacon model, be included as part of the EPIRB identification. This ensures that the 15 hexadecimal identity number remains unique, even when the country code is changed.

16 To avoid, as far as possible, unduly eliminating real distress alerts from miscoded beacons, special processing techniques have been developed and implemented by COSPAS-SARSAT LUT operators, allowing for the computation and distribution of the Doppler position, even when the recovered beacon message is grossly incorrect.

17 It is recognised that miscoded and/or unregistered EPIRBs add to the workload of SAR services. Further possible actions will be considered by COSPAS-SARSAT to enhance 406 MHz EPIRB coding and registration, and facilitate their control by national Administrations. However, it should also be noted that COSPAS-SARSAT Participants have no control over the enforcement of proper beacon coding and registration in other countries.

Action requested of the Sub-Committee

18 The Sub-Committee is invited to note the information provided and decide as appropriate.
